

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	11804	(RFID or ((wireless\$2 or electronic\$5) NEAR3 (tag or tags or label or labels or device\$1))) AND ((guess\$4 or identif\$8 or infer\$5 or presum\$6 or identit\$4) NEAR5 (customer\$1 or consumer\$1 or patron\$1 or person or persons or people or shopper\$1))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/02/10 14:56
L2	1993	(RFID or ((wireless\$2 or electronic\$5) NEAR3 (tag or tags or label or labels or device\$1))) SAME ((guess\$4 or identif\$8 or infer\$5 or presum\$6 or identit\$4) NEAR5 (customer\$1 or consumer\$1 or patron\$1 or person or persons or people or shopper\$1))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/02/10 15:12
L3	1976	2 SAME (identit\$4 or name\$1 or identif\$7)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/02/10 15:12
L4	1979	2 AND ((identit\$4 or name\$1 or identif\$7) NEAR5 (customer\$1 or consumer\$1 or patron\$1 or person or persons or people or shopper\$1))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/02/10 15:13
L5	660	2 AND ((identit\$4 or name\$1 or identif\$7) NEAR5 (customer\$1 or consumer\$1 or patron\$1 or person or persons or people or shopper\$1) NEAR10 (tag\$1 or label\$1 or RFID\$1))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/02/10 15:20
<i>Kuiz</i> L6	148	5 AND "705"/\$.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/02/10 15:22
<i>skipped</i> L7	1	("20030065595").PN.	US-PGPUB; USPAT	OR	OFF	2006/02/10 15:27
<i>skipped</i> L8	2	("20020116348") or ("6119933").PN.	US-PGPUB; USPAT	OR	OFF	2006/02/10 15:35
<i>Kuiz</i> L9	258	(presum\$6 or assum\$6 or infer\$6 or guess\$4) NEAR6 (identit\$4 or identif\$7 or name\$1) NEAR5 (customer\$1 or consumer\$1 or patron\$1 or shopper\$1)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/02/10 16:23

<i>Skipped</i>	L10	1	("5459306").PN.	USPAT	OR	OFF	2006/02/10 15:45
<i>kurz</i>	L11	45	9 SAME (purchas\$4 or buy\$4 or bought or sell\$4 or sold)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/02/10 15:50
<i>Skipped</i>	L12	1	("5918211").PN.	USPAT	OR	OFF	2006/02/10 15:51
	L13	8881	((shopping or store) NEAR3 (cart\$1 or basket\$1))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/02/10 16:23
	L14	378	13 SAME ((identit\$4 or identif\$7 or name\$1) NEAR5 (customer\$1 or consumer\$1 or patron\$1 or shopper\$1))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/02/10 16:35
	L15	0	intelligent ADJ fitting ADJ room\$1	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/02/10 16:35
	L16	0	intelligent NEAR2 fitting ADJ room\$1	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/02/10 16:35
<i>kurz</i>	L17	15	(track\$4 NEAR5 (movement\$1 or position\$1 or path\$1) NEAR5 (customer\$1 or consumer\$1 or patron\$1 or shopper\$1)) SAME (RFID or (radio ADJ frequency))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/02/10 16:36
	L18	51	(track\$4 NEAR5 (movement\$1 or position\$1 or path\$1) NEAR5 (customer\$1 or consumer\$1 or patron\$1 or shopper\$1)) AND (RFID or (radio ADJ frequency))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/02/10 16:37
<i>kurz</i>	L19	36	18 not 17	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/02/10 17:08

*Summed*

L20	15	clack-j\$.in.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/02/10 17:09
(L21	1	("0199753").PN.	USPAT	OR	OFF	2006/02/10 17:09

Dialog  
2/10/06

Your SELECT statement is:

s ((presum? or assum? or infer? or correl?)(6n)(identit? or identif? or name? ?)(5n)(customer? ? or consumer? ? or patron? ? or shopper? ?)(5n)(purchas? or cart? ? or basket? ? or product? ? or item? ? or goods)) and (RFID or radio()frequency)

Items	File
-----	-----
1	13: BAMP_2006/Jan W5
4	15: ABI/Inform(R)_1971-2006/Feb 10
1	16: Gale Group PROMT(R)_1990-2006/Feb 09
Processing	
1	20: Dialog Global Reporter_1997-2006/Feb 09
1	47: Gale Group Magazine DB(TM)_1959-2006/Feb 10
Examined 50 files	
1	101: Disclosure Database(R)_2006/Feb W1
1	103: Energy SciTec_1974-2006/Jan B2
Examined 100 files	
Processing	
3	148: Gale Group Trade & Industry DB_1976-2006/Feb 10
>>>I/O error in file 156	
1	180: Federal Register_1985-2006/Feb 07
Examined 150 files	
Examined 200 files	
3	340: CLAIMS(R)/US Patent_1950-06/Feb 07
>>>File 348 processing for IDENTIF? stopped at IDENTIFIZIERUNGSINFORMATIONSSIGN	
3	348: EUROPEAN PATENTS_1978-2006/Jan W05
>>>File 349 processing for IDENTIF? stopped at IDENTIFIKATIONEN	
15	349: PCT FULLTEXT_1979-2006/UB=20060112,UT=20060105
Examined 250 files	
Examined 300 files	
Examined 350 files	
Processing	
1	553: Wilson Bus. Abs._1982-2004/Dec
>>>I/O error in file 606	
Examined 400 files	
1	610: Business Wire_1999-2006/Feb 10
1	621: Gale Group New Prod.Annou.(R)_1985-2006/Feb 10
1	641: Rocky Mountain News_Jun 1989-2006/Feb 10
1	649: Gale Group Newswire ASAP(TM)_2006/Feb 06
Processing	
52	654: US Pat.Full._1976-2006/Feb 07
Examined 450 files	
Examined 500 files	
1	774: EdgarPlus(TM)-Prospectuses_2004/Oct 08
Examined 550 files	
Processing	
2	991: NewsRoom 2005 Jan 1-2005/Aug 30
Processing	
Processing	
1	993: NewsRoom 2003
2	994: NewsRoom 2002

22 files have one or more items; file list includes 560 files.  
One or more terms were invalid in 5 files.

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Dialog  
2/10/06

Your SELECT statement is:

s (IBM and RFID and ((identit??? or identif????????)) (4n) (consumer? ? or customer? ? or shopper? ? or patron? ?)))

Items	File
----	----
13	9: Business & Industry(R)_Jul/1994-2006/Feb 09
8	13: BAMP_2006/Jan W5
24	15: ABI/Inform(R)_1971-2006/Feb 10
50	16: Gale Group PROMT(R)_1990-2006/Feb 09
46	20: Dialog Global Reporter_1997-2006/Feb 09
5	47: Gale Group Magazine DB(TM)_1959-2006/Feb 10
Examined 50	files
1	75: TGG Management Contents(R)_86-2006/Jan W4
1	88: Gale Group Business A.R.T.S._1976-2006/Feb 06
2	101: Disclosure Database(R)_2006/Feb W1
1	122: Harvard Business Review_1971-2006/Jan
Examined 100	files
52	148: Gale Group Trade & Industry DB_1976-2006/Feb 10
>>>I/O error in file 156	
Examined 150	files
43	211: Gale Group Newsearch(TM)_2006/Feb 10
1	248: PIRA_1975-2006/Jan W3
5	258: AP News Jul_2000-2006/Feb 10
1	262: CBCA Fulltext_1982-2006/Feb 06
7	275: Gale Group Computer DB(TM)_1983-2006/Feb 09
Examined 200	files
3	348: EUROPEAN PATENTS_1978-2006/Jan W05
39	349: PCT FULLTEXT_1979-2006/UB=20060119,UT=20060112
Examined 250	files
Examined 300	files
1	471: New York Times Fulltext_1980-2006/Feb 10
2	482: Newsweek_2000-2006/Feb 09
1	483: Newspaper Abs Daily_1986-2006/Feb 08
3	484: Periodical Abs Plustext_1986-2006/Feb W1
1	485: Accounting & Tax DB_1971-2006/Jan W3
1	512: ESPICOM Telecom./Power Rpts_2006/Jan
Examined 350	files
2	545: Investext(R)_1982-2006/Feb 10
5	570: Gale Group MARS(R)_1984-2006/Feb 09
1	589: FI Defense Market Intelligence_2006/Feb 08
Examined 400	files
24	610: Business Wire_1999-2006/Feb 10
16	613: PR Newswire_1999-2006/Feb 09
3	619: Asia Intelligence Wire_1995-2006/Feb 09
30	621: Gale Group New Prod.Annou.(R)_1985-2006/Feb 10
1	629: EIU:BUS. Newsletters_2006/Feb W1
3	635: Business Dateline(R)_1985-2006/Feb 10
5	636: Gale Group Newsletter DB(TM)_1987-2006/Feb 09
4	647: CMP Computer Fulltext_1988-2006/Feb W3
30	649: Gale Group Newswire ASAP(TM)_2006/Feb 06
168	654: US Pat.Full._1976-2006/Feb 07
Examined 450	files
1	674: Computer News Fulltext_1989-2005/Oct W2
1	701: St Paul Pioneer Pr Apr_1988-2006/Feb 03
1	703: USA Today_1989-2006/Feb 09
1	727: Canadian Newspapers_1990-2006/Feb 10
1	728: Asia/Pac News_1994-2005/Dec W2
Examined 500	files
1	755: New Zealand Newspapers_1995-2006/Feb 10
4	759: Business Insights_1992-2006/Feb

13 761: Datamonitor Market Res.\_1992-2006/Feb  
8 781: ProQuest Newsstand\_1998-2006/Feb 10  
1 813: PR Newswire\_1987-1999/Apr 30  
Examined 550 files  
39 990: NewsRoom Current\_Sep 1 -2006/Feb 09  
39 991: NewsRoom 2005 Jan 1-2005/Aug 30  
74 992: NewsRoom 2004 Jan 1-2004/Dec 31  
25 993: NewsRoom 2003  
2 994: NewsRoom 2002  
1 995: NewsRoom 2001  
1 996: NewsRoom 2000

54 files have one or more items; file list includes 560 files.  
One or more terms were invalid in one file.

Dialog  
2/10/06

Set	Items	Description
S1	816	(IBM AND RFID AND ((IDENTIT??? OR IDENTIF??????????) (4N) (CO-NSUMER? ? OR CUSTOMER? ? OR SHOPPER? ? OR PATRON? ?)))
S2	479	RD (unique items)
S3	11	S2 NOT PY>2000 <i>—kurt</i>
File	9:	Business & Industry(R) Jul/1994-2006/Feb 09 (c) 2006 The Gale Group
File	13:	BAMP 2006/Jan W5 (c) 2006 The Gale Group
File	15:	ABI/Inform(R) 1971-2006/Feb 10 (c) 2006 ProQuest Info&Learning
File	16:	Gale Group PROMT(R) 1990-2006/Feb 09 (c) 2006 The Gale Group
File	20:	Dialog Global Reporter 1997-2006/Feb 09 (c) 2006 Dialog
File	47:	Gale Group Magazine DB(TM) 1959-2006/Feb 10 (c) 2006 The Gale group
File	75:	TGG Management Contents(R) 86-2006/Jan W4 (c) 2006 The Gale Group
File	88:	Gale Group Business A.R.T.S. 1976-2006/Feb 06 (c) 2006 The Gale Group
File	101:	Disclosure Database(R) 2006/Feb W1 (c) 2006 Thomson Financial
File	122:	Harvard Business Review 1971-2006/Jan (c) 2006 Harvard Business Review
File	148:	Gale Group Trade & Industry DB 1976-2006/Feb 10 (c) 2006 The Gale Group
File	211:	Gale Group Newsearch(TM) 2006/Feb 10 (c) 2006 The Gale Group
File	248:	PIRA 1975-2006/Jan W3 (c) 2006 Pira International
File	258:	AP News Jul 2000-2006/Feb 10 (c) 2006 Associated Press
File	262:	CBCA Fulltext 1982-2006/Feb 06 (c) 2006 Micromedia Ltd.
File	275:	Gale Group Computer DB(TM) 1983-2006/Feb 09 (c) 2006 The Gale Group
File	348:	EUROPEAN PATENTS 1978-2006/Jan W05 (c) 2006 European Patent Office
File	349:	PCT FULLTEXT 1979-2006/UB=20060119,UT=20060112 (c) 2006 WIPO/Univentio
File	471:	New York Times Fulltext 1980-2006/Feb 10 (c) 2006 The New York Times
File	482:	Newsweek 2000-2006/Feb 09 (c) 2006 Newsweek, Inc.
File	483:	Newspaper Abs Daily 1986-2006/Feb 08 (c) 2006 ProQuest Info&Learning
File	484:	Periodical Abs Plustext 1986-2006/Feb W1 (c) 2006 ProQuest
File	485:	Accounting & Tax DB 1971-2006/Jan W3 (c) 2006 ProQuest Info&Learning
File	512:	ESPICOM Telecom./Power Rpts 2006/Jan (c) 2006 ESPICOM Bus. Int. Ltd.
File	545:	Investext(R) 1982-2006/Feb 10 (c) 2006 Thomson Financial Networks
File	570:	Gale Group MARS(R) 1984-2006/Feb 09 (c) 2006 The Gale Group
File	589:	FI Defense Market Intelligence 2006/Feb 08 (c) 2006 Forecast Intl/DMS
File	610:	Business Wire 1999-2006/Feb 10 (c) 2006 Business Wire.

File 613:PR Newswire 1999-2006/Feb 09  
(c) 2006 PR Newswire Association Inc  
File 619:Asia Intelligence Wire 1995-2006/Feb 09  
(c) 2006 Fin. Times Ltd  
File 621:Gale Group New Prod.Annou.(R) 1985-2006/Feb 10  
(c) 2006 The Gale Group  
File 629:EIU:BUS. Newsletters 2006/Feb W1  
(c) 2006 Economist Intelligence Unit  
File 635:Business Dateline(R) 1985-2006/Feb 10  
(c) 2006 ProQuest Info&Learning  
File 636:Gale Group Newsletter DB(TM) 1987-2006/Feb 09  
(c) 2006 The Gale Group  
File 647:CMP Computer Fulltext 1988-2006/Feb W3  
(c) 2006 CMP Media, LLC  
File 649:Gale Group Newswire ASAP(TM) 2006/Feb 06  
(c) 2006 The Gale Group  
File 654:US Pat.Full. 1976-2006/Feb 07  
(c) Format only 2006 Dialog  
File 674:Computer News Fulltext 1989-2005/Oct W2  
(c) 2005 IDG Communications  
File 701:St Paul Pioneer Pr Apr 1988-2006/Feb 03  
(c) 2006 St Paul Pioneer Press  
File 703:USA Today 1989-2006/Feb 09  
(c) 2006 USA Today  
File 727:Canadian Newspapers 1990-2006/Feb 10  
(c) 2006 Southam Inc.  
File 728:Asia/Pac News 1994-2005/Dec W2  
(c) 2005 Dialog  
File 755:New Zealand Newspapers 1995-2006/Feb 10  
(c) Fairfax New Zealand Ltd.  
File 759:Business Insights 1992-2006/Feb  
(c) 2006 Datamonitor  
File 761:Datamonitor Market Res. 1992-2006/Feb  
(c) 2006 Datamonitor  
File 781:ProQuest Newsstand 1998-2006/Feb 10  
(c) 2006 ProQuest Info&Learning  
File 813:PR Newswire 1987-1999/Apr 30  
(c) 1999 PR Newswire Association Inc  
File 990:NewsRoom Current Sep 1 -2006/Feb 09  
(c) 2006 Dialog  
File 991:NewsRoom 2005 Jan 1-2005/Aug 30  
(c) 2005 Dialog  
File 992:NewsRoom 2004 Jan 1-2004/Dec 31  
(c) 2005 Dialog  
File 993:NewsRoom 2003  
(c) 2005 Dialog  
File 994:NewsRoom 2002  
(c) 2005 Dialog  
File 995:NewsRoom 2001  
(c) 2005 Dialog  
File 996:NewsRoom 2000  
(c) 2005 Dialog

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[www.NexTag.com/Pet-Accessories](http://www.NexTag.com/Pet-Accessories)**Feature article: Fifty uses of RFID in retail - RFID (radio ...**#38 - **PDA-based shopping** lists that interact with RFID tagged merchandise and store map. ... The warning could be shown on a display on the **shopping cart**, ...[www.usingrfid.com/features/read.asp?id=3](http://www.usingrfid.com/features/read.asp?id=3) - [Similar pages](#)**Shopping cart Experts - CCNow Online Credit Card Processing and ...**... will be unable to return to the **shopping cart** screen and finish the order. ... Be sure that **customers** are familiar with your **products** before they order. ...[www.ccnnow.com/clientTips.html](http://www.ccnnow.com/clientTips.html) - 10k - [Cached](#) - [Similar pages](#)**ecommerce | The Roles Within Commerce**When a potential **customer** is frustrated, s/he will exit; the merchant has the ... accessing the **shopping cart** function or requiring a specific browser for ...[www.philosophe.com/commerce/roles.html](http://www.philosophe.com/commerce/roles.html) - 20k - [Cached](#) - [Similar pages](#)**How Does Shopping Cart Software Work?**The better software **products** keep an online database of **customers**. ... **based on** previous purchases or items placed in the **shopping cart**; Allowing **customer** ...[www.wilsonweb.com/wct7/cart\\_intro.htm](http://www.wilsonweb.com/wct7/cart_intro.htm) - 63k - [Cached](#) - [Similar pages](#)**Fortune3: Shopping Cart, E-Commerce Software and Ecommerce Solutions**You can offer the "Wire Transfers" option as a payment method in your **shopping cart**, but only to provide information to the **customer** about the bank account ...[www.fortune3.com/en/wizard4.0/mycompanypage.shtml](http://www.fortune3.com/en/wizard4.0/mycompanypage.shtml) - 72k - [Cached](#) - [Similar pages](#)**Storefront Shopping Cart Software / Download / E-Commerce ...**Storefront Web site **shopping cart** software - Online Help: Download our ... may offer **customers** lower shipping prices for consolidating the **products** added to ...[www.fortune3.com/en/wizard4.0/full\\_content.shtml](http://www.fortune3.com/en/wizard4.0/full_content.shtml) - 101k - Feb 9, 2006 -[Cached](#) - [Similar pages](#)**CRM Today: Data Mining and CRM**Basic segmentation is often used to group **customers** by easily **identified**, ... site path, **shopping** and **shopping cart** abandonment to describe **customer** ...[www.crm2day.com/library/EpFEAkAFpuEZkNWvTr.php](http://www.crm2day.com/library/EpFEAkAFpuEZkNWvTr.php) - 47k - [Cached](#) - [Similar pages](#)**Ubiquitous Computing, Customer Tracking, and Price Discrimination**File Format: PDF/Adobe Acrobat - [View as HTML](#)If simple price discrimination **based on customer** tracking is not optimal with ... may **identify** the user and provide information through the **shopping cart** ...

[www.heinz.cmu.edu/~acquisti/papers/acquisti-ubiquitous.pdf](http://www.heinz.cmu.edu/~acquisti/papers/acquisti-ubiquitous.pdf) - [Similar pages](#)

This document describes how to interface a web-based "shopping ...

1.3.1 **Identification.** The e-gold® **Shopping Cart** Interface (SCI) is an HTML forms-based interface that merchants can incorporate into their web-based ...

[www.e-gold.com/docs/e-gold\\_sci.html](http://www.e-gold.com/docs/e-gold_sci.html) - 363k - [Cached](#) - [Similar pages](#)

**Dansie Shopping Cart - ReadMe.**

Set this to 0 if you want the **cart** to **identify** your **customer** by their IP ... The Dansie

**Shopping Cart** can calculate discounts for your **customers** based upon ...

[www.dansie.net/examples/ReadMe.html](http://www.dansie.net/examples/ReadMe.html) - 101k - Feb 8, 2006 - [Cached](#) - [Similar pages](#)

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## Fifty uses of RFID in retail


[Ads by Go](#)

By NCR Corporation (Retail Solutions Division)  
Published by [UsingRFID.com](#) in November 2003.

[Guide to  
Product  
of RFID  
RFID-101.](#)

**UsingRFID summarises a few of NCR's 'Big 50' ideas for using of RFID in retail to improve the supply chain, merchandising, marketing, cross-selling, customer service, security, operational efficiency, and more.**

With many retailers, particularly those involved in 'mass merchandising', offering similar products, services, and prices, competitive advantage often relies on merchandise selection and availability, marketing, cross-selling, promotions, customer service, operational efficiency, and protection of both merchandise and store property. A promising technology for effecting gains on all of these dimensions is radio frequency identification (RFID) coupled with a unique code.

[Top RFI  
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The Win  
Now!  
www.inCo](#)

RFID technology has been in use for decades, initially in military applications, such as tracking material in rugged and fast-moving situations where barcodes could not be used. More recently, it has been used to identify vehicles passing through tollbooths so that motorists can be billed monthly rather than pay each time they pass through the booth. Only within the past few years has this technology been considered as a complement and an eventual replacement for barcode technology in the retail industry. Three aspects of RFID that make it a particularly attractive alternative to barcode are that:

[RFID AI  
RFID no  
Try iButt  
Future.  
www.ibutt](#)

- It allows information to be read by radio waves from a tag without requiring line of sight scanning;
- It allows virtually simultaneous and instantaneous reading of multiple tags in the vicinity of the reader;
- Each tag can have a unique code that ultimately allows every tagged item to be individually accounted for.

[The REI  
RFID Ne  
Day Fre  
or RSS  
www.rfidur](#)

### What's in a tag?

The RFID tag consists of a tiny chip, approximately the size of a pinhead, on which the RFID code resides, and a small antenna. RFID tags can be manufactured with a variety of chip architectures and code formats. One code format that enjoys substantial support in the retail industry is the Electronic Product Code (EPC). The EPC uses a 96-bit scheme advocated by EPCglobal (previously known as the Auto-ID Center). Some prominent retailers are suggesting that an even larger code may be helpful, while other organizations have advocated a more compact, 64-bit code for at least some purposes. No matter which format is used, all of these coding schemes are capable of uniquely identifying trillions of objects.

[RFID In:  
Read U  
Downlo  
White P  
www.bitpic](#)

The real power of this technology for retail results from associating these unique identifiers with other information of interest from fields in a database that pertains to the item. Just a few examples with retail application are:

- Date of manufacture

[Advertise](#)

- Time spent in transit
- Location of distribution centre holding the item
- Name of the last person to handle the item
- Amount for which the item was sold
- Payment method used in buying the item
- Expiration date
- Last date of service
- Warranty period

While most of these fields will be stored in a computer system that is detached from the tag, some RFID tag technologies permit additional information to be written to the tag itself as well as being removed from it.

### **Financial opportunities**

The opportunities for improving retail business through RFID are enormous. Barcodes and universal product codes (UPCs), offering a fraction of the advantages of RFID, were able to provide hard and soft savings (as percentages of revenue) of 2.76% and 2.89% for the grocery industry alone (Haberman, 2001).

By being able to quickly and uniquely identify and track objects, RFID goes beyond the capabilities of barcodes and UPCs in allowing:

- Inventories to be better managed
- Customers to be better served
- Merchandise to be more effectively displayed to attract purchase
- Merchandise to be sold with higher margins
- Merchandise and store property to be better protected
- Labour to be more effectively utilized

### **Retail benefits**

RFID facilitates quick and accurate counts of store inventory, giving stores reliable information for deciding when to reorder and how much to reorder. This can substantially improve a retailer's revenue picture. In fact, a study by the Grocery Manufacturers of America, the Food Marketing Institute, and CIES (Gruen, Corsten & Bharadwaj, 2002) showed that out-of-stock conditions average 8.3% and cause a typical retailer to lose 4% of sales.

Shrink, resulting from employee theft, shoplifting, administrative and paper error, and vendor fraud is a huge concern of retailers that RFID can address. According to the University of Florida's 2002 National Retail Security Survey (Hollinger & Davis, 2003), retailers in the USA alone lost US\$31.3 billion to shrink. A 2003 report by Ernst & Young estimates an even higher amount - some US\$46 billion annually. And these figures do not include losses due to spoilage/expiration, obsolescence, misplacement, and markdowns caused by poor merchandise management, all of which could be reduced by the better monitoring of objects and their handlers through RFID.

### **Tag pricing**

The cost of the tags, readers, and business process changes (e.g. integrating RFID codes, associated data fields, and existing database systems) are some of the challenges to adoption of RFID. However, like most things, as a critical mass is reached, many costs will drop. In 2000, the most basic tags cost approximately US\$1 each. In 2003, they range from about US\$0.25 to US\$0.40, as adoption increases and refinements in manufacturing technology come about. At those prices, it is still not yet economical to individually tag low-cost items in the store inventory, such as most grocery items. However, there already is a business case for individually tagging expensive items, such as certain electronics merchandise, and items that are particularly prone to theft, such as CDs, DVDs, and even razor blades. In fact, Gillette, realizing the value that RFID holds for reducing theft of its razor blades, has already ordered 500 million tags.

It is also practical right now to begin tagging pallets of merchandise and perhaps even cases. Wal-Mart has mandated that its top 100 suppliers will tag pallets by early 2005. The US Department of Defense (DoD) has mandated that new contracts with its suppliers include RFID tracking of all sustainment cargo, unit movement equipment and cargo, ammunition shipments, and pre-positioned material and supplies by January of 2005.

Given the volume of tags that will be needed to serve the world's largest retailer and the US military, and the improvements in manufacturing methods, the cost per tag should fall to about US\$0.05 within the next few years (according to Sarma, 2001; Niemeyer, Pak, & Ramaswamy, 2003). This will make it increasingly feasible to begin tagging retail items at the individual item level.

### Tagging levels

As will be seen in the small selection of NCR's fifty ideas cited below, retailers can benefit from tagging four types of things:

- Merchandise for sale (with tags being applied to individual items, cases containing the items, and/or on shipping pallets holding the merchandise);
- Store property (shopping carts, computers, etc.);
- Wireless communications devices (cellular telephones, and mobile computing devices associated with specific shoppers or employees);
- People (shoppers and employees identified by their RFID-tagged loyalty cards, badges, uniforms, etc).

### RFID in Stores – NCR's 'List of 50'

Here we introduce just a few of NCR's fifty ideas on RFID which may change how business is conducted within the retail store over the course of the next decade. These ideas are derived from emerging concepts in retail technology that can improve operations and customer service within the store. Most of these assume tagging at the item level, but some offer substantial benefits at the pallet and case levels as well.

- **#1 - Store management alerted to out-of-place items.** An in-store system could use RFID to monitor actual versus intended product location on the floor or in the stockroom. By using RFID-encoded shelf edge labels with embedded shelf readers, a grid could be set up for verifying planogram compliance for standard shelving and promotional displays, with a corresponding alert for misplaced items sent to store personnel. Big payoffs could be realized for frequently moved and misplaced items, such as shoes, CDs and DVDs.
- **#2 - Re-stocking alerts and replenishment.** Shelves are monitored to make sure they remain stocked at appropriate levels. When they fall below that level, an alert is sent to the stockroom or office to bring out more merchandise and/or to order more merchandise. For stores with stockrooms, RFID monitoring alerts employees when stockroom levels reach the threshold for reordering. Depending on how the system is configured, reorders may be done automatically for items that the store plans to continue to buy.
- **#8 - Reduced need to check merchandise carried by customer into store.** Some stores require customers to leave merchandise that they are carrying into the store at a desk or provide evidence of purchase. However, if a store had RFID readers/writers and RFID-tagged merchandise, shoppers could avoid this step. Rather, at checkout, the readers would charge customers only for items with tags that indicated that they were not already paid for.
- **#9 - Alerts and tracking of merchandise removed from shelf.** When a particular type of item (e.g. an expensive one that would be easy to conceal) or an unusually large quantity is removed from a shelf, an alert could be sent to store security, and it could then track the movement of the merchandise with graphical displays on computers or PDAs. Store cameras could also be programmed to automatically pan and tilt to follow the customer with the merchandise until it is paid for.

- **#10 - Monitoring controlled substances.** If the packaging of controlled substances (certain drugs) were tagged with RFID, their movement from receiving to storage to handoff to customer to removal from the premises could be closely monitored.
- **#15 - Expiration and obsolescent/seasonal alerts.** For food and drug, notification could be sent when RFID-tagged merchandise was approaching an expiration date, becoming obsolete to newer models or seasonal change, or 'going bad' as indicated by sensors attached to the merchandise. Store personnel could move that time-sensitive merchandise to the front of the shelf, reduce its price to promote faster sale, or ship it to a store with greater demand.
- **#19 - Rejection of counterfeit or fraudulent merchandise.** A store could use RFID tag readers to authenticate merchandise received from suppliers or from customers doing returns. This of course acts for the customer's protection as well as the protection of the store against defective merchandise in its inventory.
- **#20 - Display of prices and expanded product information on mobile devices and kiosks.** Information about price, warranty, capabilities, preparation/assembly, etc. could be made available on a personal digital assistant, cellular telephone, shopping cart display, or kiosk equipped with an RFID reader that accessed a store database for product information. While the product's barcode could enable some of this functionality, the finer-grained capabilities of RFID would be required for displaying information such as expiration date, size, color, etc. This would make it easier for shoppers to find the information for which they are looking than trying to locate it on the package or having to open the package and examine enclosed documentation or product.
- **#24 - Streamlined self-checkout.** Since RFID could do away with the need to remove items from the cart or basket (except perhaps for bagging) and scan them, self-checkout would be simplified and become more attractive to customers. Even bagging at the checkout could be eliminated if shopping carts are built to facilitate bagging as the customer shops.
- **#32 - Dynamic pricing.** RFID can be used in conjunction with electronic shelf labels to automate pricing based on the number of items on the shelf (and available from the stockroom) and rules set up by store. For example, if the store were trying to clear out items, RFID could be used to automatically reduce prices based on inventory remaining to be sold at any point in time. Alternatively, when certain popular items were in short supply (e.g. at Christmas time), the price can be automatically raised. The new price would automatically be associated with the item at checkout.
- **#38 - PDA-based shopping lists that interact with RFID tagged merchandise and store map.** If the shopper came into the store with a shopping list on a mobile electronic device, such as a personal digital assistant, the shopper could transmit the list to the store. The store would then use RFID to locate the shopper (identified by an RFID tagged hand-held device or loyalty card) and the RFID tagged items on the list. It would transmit to the mobile device a path for finding the things on the list. The shopper could be alerted to items on the list and associated promotions as they were approached. Based on shopper characteristics stored on a database, the system could suggest either the most direct route or one that takes the shopper past items that may be of interest even though they were not on the list.
- **#41 - Warnings about contents to which a shopper or family member is allergic or wants to avoid.** If food or clothing were tagged with RFID that could provide information about the ingredients and materials composing the item, shoppers could be warned about items to which they or a family member was allergic when those items were placed in their shopping carts/baskets equipped with RFID readers. This would be done by having software that compared the contents of the selected items with profiles that the shoppers set up for things that they wanted to be warned of. The warning could be shown on a display on the shopping cart, on an RFID-tagged cell phone or personal digital assistant, or on a kiosk to which the customer could go to review selections before checkout. A smart system that indexed items in the store's inventory by type (e.g. sweater) or purpose (e.g. sweetener) and accessed the composition of those items could suggest alternatives that did not contain the problematic component and tell the shopper where to find them. This same approach could help shoppers avoid other kinds of merchandise (e.g. items containing animal content or by-products objectionable to vegans) and find acceptable substitutes.

- **#49 - Mapping shopping behaviours.** By tagging carts and baskets with RFID, individual shopper movements through the store could be precisely tracked in real time. The data could be used to map paths typically followed by shoppers and the amounts of time that shoppers spent in certain parts of the store. RFID would enable stores to track how often a particular item was removed from a shelf, rack, container, or promotional display for inspection and even how long it was removed. This could provide data from which to infer shopper interest, as demonstrated at the Tokyo International Book Fair 2003 (Chai, 2003). Length of stops in certain store areas and frequency and length of handling merchandise could be correlated with actual purchase of the item to learn whether shoppers were merely interested in the item or whether their inspection led to a sale.

This article is derived from the NCR Corporation's white paper entitled 'RFID in the Store: 50 ideas for revolutionising the Store through RFID'.

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## About the author...

This article is derived from the NCR Corporation's white paper entitled 'RFID in the Store: 50 ideas for revolutionising the Store through RFID'. The Store Performance Consulting Department coordinated its development, with members of the Marketing, Professional Services, Advanced Development, and Product Development organizations also making important contributions.

NCR has extensive experience with many of the in-store components with which RFID will likely interact and, in some cases, replace. It claims to have been the first technology provider to:

- Introduce barcode scanning to retail;
- Deliver an integrated keyboard and display for the point-of-sale terminal;
- Provide an open-architecture, PC-based point-of-sale terminal;
- Offer a fully integrated, wireless electronic shelf label solution.

NCR's own electronic shelf label solution is based on radio frequency technology, providing retail business and technology insights that can facilitate an understanding of how best to design and implement RFID. The firm is also providing software that works with a host of proprietary and third-party hardware components to increase overall store productivity. It is from this vantage point that NCR offers its view of 50 potential applications of RFID within the retail store.

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